

AMENDMENTS TO THE SPECIFICATION:

Please replace the text of current paragraph 31 with the text below:

Referring back to Figure 2, the resistive value of MTJ 100 is indicative of the bit state stored in cell 103. To read the bit state stored in cell 103, a voltage is applied to read bit line 104 and read word line 223. The resistive value of MTJ is then measured by a sense amplifier (not shown). The resistive value of MTJ 100 is dependent upon the direction of the magnetic polarization of free layers 305 and 309 of MTJ 100.

Please replace the text of current paragraph 35 with the text below:

Figure 5 shows the magnitude of magnetic fields applied to MTJ 100 in the X (represented by 505) and Y (represented by 503) directions by applying current to lines 102 and 114 during a write cycle. Applying current through one of lines 102 and 114 generates a magnetic field (H_y) in the Y direction and applying current through the other of lines 102 and 114 generates a magnetic field (H_x) in the X direction. The X and Y directions are in the same plane as H_1 and H_2 in Figure 2. The timing of H_y and H_x during one example of a write cycle as illustrated in the polarization diagrams of Figure 4 is shown in Figure 5.

Please replace the text of current paragraph 40 with the text below:

Since an MTJ includes two metal layers separated by a dielectric layer (e.g. tunnel junction dielectric 311), it also has a capacitive component. The capacitance of the MTJ can be approximated by:

$$C_{MTJ} = \epsilon_r \epsilon_o \frac{A_{MTJ}}{t_{ox}} \quad (6)$$

where ϵ_r is the relative dielectric constant of the dielectric, (Al_2O_3 in one embodiment), ϵ_0 is the permittivity of free space, A_{MTJ} is the area of the MTJ, and t_{ox} is the thickness of the tunnel junction dielectric in the MTJ.

Please replace the text of current paragraph 76 with the text below:

Figure 11 is a plot of polynomial coefficient parameters (A, B, C) for the curves shown in Figure 9 (equations 16-21) as a function of temperature. As shown in Figure 11 for the case of the low resistance state, a linear temperature function provides a reasonable fit for the polynomial coefficient parameters. The curves for A (1103), B (1107), and C (1105) for the data plotted in Figure 9 are given below:

$$A = .032T + 58.3 \quad (29)$$

$$B = 0.004T + 3.2 \quad (30)$$

$$C = 0.032T + 16.9 \quad (31)$$

where T is temperature.

Please replace the text of current paragraph 127 with the text below:

Finally, the current through the MTJ is calculated from the voltage using the conductance parameter values and capacitance models (not shown in the Figures) in operation 1917. The conductance parameter values utilized depends upon the most recent conductance values set and the transition simulation performed in 1915 if the parameters were changed during recent iterations. After the MTJ current is calculated, control is returned in 1919 to other portions of the simulation.